

CLAIMS

What is claimed is:

[C1] 1. A biocompatible device comprising:  
a device for implantation in living tissue;  
a thin film of ultra-nanocrystalline diamond deposited on said biocompatible device wherein said thin film forms at least a portion of a biocompatible hermetically sealed package.

[C2] 2. The biocompatible device of claim 1 wherein  
said biocompatible device is comprised of one or more subassemblies which are coated with ultra-nanocrystalline diamond to achieve a biocompatible hermetically sealed package.

[C3] 3. The biocompatible device according to claim 1 wherein  
said biocompatible device comprises an electronic device.

[C4] 4. The biocompatible device according to claim 3 wherein  
said biocompatible device comprises a magnet.

[C5] 5. The biocompatible device of claim 3 wherein  
said biocompatible device is at least partially coated with an ultra-nanocrystalline diamond film that comprises an electrical insulator.

[C6] 6. The biocompatible device of claim 3 wherein  
said biocompatible device is at least partially coated with an ultra-nanocrystalline diamond film that comprises an electrical conductor.

[C7] 7. The biocompatible device according to claim 3 wherein said thin film is doped to provide for electrical conductivity.

[C8] 8. The biocompatible device according to claim 7 wherein a thin film of ultra-nanocrystalline diamond is doped to form one or more electrodes, where said one or more electrodes are an integral part of said thin film, for communicating electrical signals with living tissue.

[C9] 9. The biocompatible device according to claim 7 wherein said doping is selective, forming electric conductivity in some locations and electrical insulation in other locations.

[C10] 10. The biocompatible device according to claim 3 wherein said electronic device comprises a sensor.

[C11] 11. The biocompatible device according to claim 3 wherein said electronic device comprises a stimulator.

[C12] 12. The biocompatible device according to claim 11 wherein said stimulator comprises a retinal electrode array prosthesis.

[C13] 13. The biocompatible device according to claim 1 wherein said biocompatible device comprises an electrically conducting wire.

[C14] 14. The biocompatible device according to claim 13 wherein said electrically conducting wire comprises a coil.

[C15] 15. The biocompatible device according to claim 1 wherein said thin film is approximately constant in thickness over uneven portion of said device to provide a smooth coating with rounded edges.

[C16] 16. The biocompatible device according to claim 1 wherein said thin film is patterned by photolithography.

[C17] 17. The biocompatible device according to claim 1 wherein said thin film is patterned by selective seeding.

[C18] 18. The biocompatible device according to claim 1 wherein said thin film is patterned by oxygen etching.

[C19] 19. The biocompatible device according to claim 1 wherein said ultra-nanocrystalline diamond forms a capacitive relationship with living tissue that is in close proximity to said biocompatible device.

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[C20] 20. A method of hermetically sealing an implantable biocompatible device comprising:

providing an implantable biocompatible device;  
depositing a thin film coating of ultra-nanocrystalline diamond on said implantable biocompatible device forming a biocompatible, hermetic seal.

[C21] 21. The method according to claim 20 wherein said step of depositing said thin film coating includes depositing said thin film coating in a constant thickness to provide for a smooth rounded package.

[C22] 22. The method according to claim 20 further comprising the step of patterning said thin film by photolithography.

[C23] 23. The method according to claim 20 further comprising the step of patterning said thin film coating by selective seeding.

[C24] 24. The method according to claim 20 further comprising the step of patterning said thin film coating by oxygen etching.

[C25] 25. The method according to claim 20 further comprising the step of doping said thin film coating to provide for electrical connectivity.

[C26] 26. The method according to claim 25 wherein said step of doping is selective, providing for electrical conductivity in some locations and electrical insulation in other locations.

[C27] 27. A biocompatible device which communicates electrical signals with tissue in a living body, comprising:

an integrated circuit, said integrated circuit comprising a semiconductor substrate having at least one surface on which electronic circuitry is formed;

electrodes for contacting the living tissue which are formed on said at least one surface of said semiconductor substrate;

means for electrically connecting said stimulator electrodes with said electronic circuitry formed on said at least one surface of said semiconductor substrate;

an ultra-nanocrystalline diamond coating that covers all areas of said at least one surface of said semiconductor substrate, except for selected portions of said stimulator electrodes; and

means for making electrical connection with and providing operating power to said electronic circuitry formed on said at least one surface of said semiconductor substrate.

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